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Virginia confirms first successful open water eradication of zebra mussels

Prince William County, VA – The Virginia Department of Game and Inland Fisheries (VDGIF) today confirms that the Commonwealth's only infestation of zebra mussels, a notorious invasive aquatic species, has been exterminated. Eradication of this noxious species from the 12-acre, 93-foot-deep abandoned quarry is believed to be the first successful eradication of zebra mussels from a large, open body of water in North America, and perhaps the world.

Virginia Secretary of Natural Resources L. Preston Bryant, Jr. said of the successful eradication, "The existence of zebra mussels in Virginia posed a very real threat to our natural resources and to our economy. The price of eradication was small compared to the potential millions of dollars that would have been needed to control zebra mussels had they escaped into adjacent waters, not to mention the permanent impact on the environment of the Commonwealth. The Department of Game and Inland Fisheries, which spear-headed this effort, along with the numerous partner agencies and organizations involved, are to be applauded for doing what no other state in the nation has been able to do: successfully eradicate an established zebra mussel population from a large open body of water."

The presence of zebra mussels in Millbrook Quarry, an abandoned rock quarry now extensively used for recreational and instructional scuba diving, was first confirmed in late August 2002. Since the discovery, VDGIF has worked with numerous federal, state, and local agencies; industry and conservation organizations; and individuals to pursue eradication of the zebra mussel population. The 3 ½ year effort involved establishing an interagency workgroup to assess the feasibility of eradicating the population; investigating the hydrologic, geochemical, and biological characteristics of the quarry and infestation; inspecting other popular dive sites and reservoirs for zebra mussel infestations; evaluating potential avenues for eradicating the zebra mussels; surveying nearby Broad Run and Lake Manassas to ensure that zebra mussels had not escaped into those adjacent waters; securing funding for the eradication; issuing a Request for Proposals to eradicate the infestation; selecting a process and contractor to conduct the eradication; and surveying Broad Run for occurrence of native mussels or other species that might be impacted by potassium seepage from the quarry. A panel of biologists, chemists, geologists, engineers, and human health experts representing seven Virginia agencies evaluated the proposals submitted by several companies, and the project contract was awarded to Aquatic Sciences L.P. of Orchard Park, NY, an industrial leader in zebra mussel control, in August 2005.

After awarding the contract, the VDGIF had to prepare a comprehensive Environmental Assessment for approval by the U.S. Department of Agriculture, the U.S. Fish and Wildlife Service, and Virginia's Department of Environmental Quality, entailing public project review by a multitude of local, state, and federal agencies. Because the selected chemical and treatment, injection of potash (potassium chloride) into the water, is not a federally registered pesticide use, VDGIF also had to secure approval to use the chemical from Virginia's Department of

Agriculture and Consumer Services and from the U.S. Environmental Protection Agency. Final approval was received January 20th, 2006, and the contractor mobilized onsite the next week.

To kill the zebra mussels through exposure to potassium, the entire quarry was injected with 174,000 gallons of potassium chloride solution over a 3-week period. Potassium concentrations throughout the quarry and in adjacent surface waters were measured each weekend during the treatment. The target concentration was 100 milligrams of potassium per liter of water (mg/l, or parts-per-million - ppm); far below the level that would invoke environmental or human health concerns, but more than twice the minimum concentration needed to kill all the zebra mussels. Sampling at various depths and locations in the quarry after treatment revealed potassium concentrations ranging from 98 to 115 ppm, and no potassium leakage from the quarry into adjacent waters has been detected to date. Because there are no surface water connections to the quarry, and groundwater exchange is limited, potassium levels in the quarry are expected to remain lethal to zebra mussels for decades, thus preventing reinfestation.

Four separate methods of confirming eradication of the infestation were implemented. First, over a thousand mussels were scraped from rocks at numerous sites around the quarry during informal assessments, revealing no live mussels. Second, VDGIF scuba divers who had documented the extent of the infestation during pre-eradication studies conducted a visual inspection of the quarry, searching for live zebra mussels but finding none. Third, Aquatic Sciences L.P. conducted extensive video survey and documentation of the dead zebra mussels through use of a robotic camera. Finally, eighty bioassays of 100 live zebra mussels each were placed at various locations and depths throughout the quarry and thus exposed to the treated quarry water. After 31 days of exposure to the treated quarry water, 100% of the test mussels had died. None of the 100 “control” zebra mussels held in untreated water drawn from Broad Run died during their bioassay period. In dramatic contrast, other aquatic wildlife including turtles, fishes, aquatic insects, and snails continue to thrive in the quarry.

Water chemistry within Millbrook Quarry, and potassium concentrations in Broad Run and in nearby landowners’ wells will be monitored by the Occoquan Watershed Monitoring Laboratory, a unit of Virginia Polytechnic Institute and State University, for 2 years to document water quality in the quarry, and leakage of potassium from the quarry into the adjacent stream or groundwater. Changes in the microbiology of the quarry sediments will also be monitored through a contract with George Mason University.

The contract awarded for the eradication and bioassays totaled approximately $365,000, with another $54,000 awarded in contracts for the post-project monitoring. Primary funding for the eradication was provided through a Wildlife Habitat Incentive Program (WHIP) grant from the Virginia Office of the Natural Resources Conservation Service of the U.S. Department of Agriculture, and through a State Wildlife Grant from the U.S. Fish and Wildlife Service. The local water authority (FairfaxWater), Prince William County, the City of Manassas, and Dominion Virginia Power contributed the matching funds required to facilitate receipt of the federal grants.

For more information about zebra mussels and the Millbrook Quarry eradication effort visit the Virginia Department of Game and Inland Fisheries Web site at www.dgif.virginia.gov.

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NOTE: Millbrook Quarry is located on private property. Media tours have not been authorized by the landowner; however, the Virginia Department of Game and Inland Fisheries has still photographs and video B-roll available upon request.